

TWENTY-SIXTH

ANNUAL REPORT

ON THE

SANITARY CONDITION

OF THE

Urban District of Watford,

FOR THE YEAR

1 8 9 8 ,


BY

DR. D. HARVEY ATTFIELD, M.A., D.P.H. CAMB.,

MEDICAL OFFICER OF HEALTH.

WATFORD :

J. E. KING, "THE POST," HIGH STREET.



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TO THE CHAIRMAN & MEMBERS OF THE WATFORD URBAN DISTRICT COUNCIL.

GENTLEMEN,

I have the honour to submit the 26th Annual Report on the Sanitary Condition of the Watford Urban District.

For the purposes of this Report I have considered the District as divided into three parts, namely—

WATFORD,
CALLOW LAND, and
BUSHEY.

The main line of the North-Western Railway serves to form the boundaries between these three divisions.

The town is largely built on the slopes of the elevations rising from the banks of the River Colne. The subsoil is mostly ferruginous gravel and chalk. As a natural consequence the District is well drained, dry, and healthy; while the penetrating rain, with its surface impurities, and all sullied water, including sewage are reconverted into pure water before reaching the stores of good (though necessarily hard) water in the pores, fissures, and caverns of the underlying chalk.

WATER SUPPLY.

The public Urban Water Supply is derived from three adjacent deep wells and borings in the chalk at the lower end of the town, but a large portion of the New Bushey area is supplied by the Colne Valley Water Co. The latter also derives its water from the chalk, but softens it by the lime process.

The town water is analysed by Professor John Attfield, F.R.S., quarterly, and his results show that though somewhat hard it is of excellent quality for all drinking purposes. There are indications that though good it is not quite so good as in former years. It is delivered clear, without filtration, from a reservoir about 270 feet above mean sea level. With the rapidly increasing population the question of quantity of water as well as quality is arising. On November 26th, 1897, a constant supply was given until March 18th, 1898, when the daily supply was cut off from 11 p.m. until 6 a.m.; on August 17 the cutting off time was changed to 10 p.m., the supply being thus limited to 16 hours.

This short supply was necessitated by the fall in the water level, technically termed the "plane of saturation," of the underground stores from whence all well-pumps of the neighbourhood draw their water. The fall was caused by the unusually small amount of rain during the previous winter. The level of the underground reservoir, as shown from the figures given by Professor Attfield, who measures and records the vertical fluctuation weekly (see page 23), continued to fall steadily through the year until the middle of October last. Since then there has been a gentle rise. Such a low condition of the natural stock is serious, and at one time we were getting within measurable distance of a water famine, hence the town supply was curtailed and no watering of the roads was allowed.

Arrangements are in progress for rendering the pumps more efficient, and, with the present so far wet winter, and the consequent replenishment of the underground stores, any immediate want of water in Watford is no longer threatened. Nevertheless the town is increasing, hence a greater draft on these stores will be required in the future. Clearly it becomes the duty of the Council of this District, as of the Sanitary

Authorities of all neighbouring Districts, most strongly to oppose those schemes of the Metropolitan Authorities which involve increase of the supplies to London by water drawn from the underground stores of Hertfordshire and other Thames Valley areas.

With the rapid increase in size of Watford there must follow increased surface fouling of the land on which rain falls, and therefore increased risk of incomplete purification of the water which percolates to the underground reservoir, possible deterioration in the quality of the water of these stores occurring. That this has already taken place, though to an insignificant extent, may be inferred from the fact that water drawn from wells just outside the District is slightly superior, both as regards chemical and bacteriological standards, to the still very good water pumped from the wells at the water works. The Council will do well to consider the advisability of sooner or later acquiring a small area of land some distance outside Watford with the view of sinking wells when a further supply of water is required. An alternative to this would be the employment of sand filtration as practised by the larger water companies. But this is a matter for future consideration. All I now mean is that when it is decided that more water must be obtained, the question of sinking a well or wells on high ground in a ferruginous gravel area should be considered, inasmuch as the greater the depth of purifying subsoil through which sullied water must pass before reaching the water stores the more thoroughly will that sullied water be filtered and purified.

The pumps supply some 800,000 gallons daily, or an average of rather more than 29 gallons per head of the population. There is doubtless great waste of water, due partly to defective fittings and partly to some carelessness by consumers. There are still many houses not supplied with separate flushing cisterns to

their waterclosets, but have instead a direct service from the main to the closet pan through a tap, not infrequently left turned on. This not only tends to great waste of water, but is a grave danger to the public health under the conditions of the present non-constant water service. For, when the water is cut off, there will be an indraught of air (through any open tap) possibly fouled by the adjacent filth, which air may thus carry obnoxious matter into the mains, this matter then being distributed far and wide when the water is turned on again. Should this matter ever happen to contain the germs of typhoid fever a serious epidemic might occur.

SEWERAGE AND DRAINAGE.

The town is for the most part sewered on the separate system. That is to say all storm water is collected and carried away by a system of drains quite separate from those general sewers which carry off the house drainage. The sewage gravitates to the sewage farm situated on the south-western outskirts of the town. Here, by means of suitable machinery, the sewage is lifted from the collecting tanks to the highest ground of the farm and is dealt with on the broad irrigation principle. During the past year the whole of the pumping plant has been replaced by modern boilers and machinery capable of dealing with the increased requirements of the town for years to come. The new plant consists of two steel Lancashire boilers for supplying the necessary steam, and a Worthington duplex high pressure triple expansion pumping engine, capable of lifting 1,000 gallons per minute to a height of 84 feet. The question of duplicating this engine is under consideration, and a second one will probably be erected during the coming year. In addition to the foregoing plant there are several of Shone's pneumatic ejectors for dealing with

(a) the sewage from those sewers which deliver to the works at a lower level than the tanks, and (b) the sewage from the new high level sewer flowing to the top of the terraces, whence it is forced by two of the ejectors, each capable of discharging 1,250 gallons per minute, to the upper part of Holywell Farm. For the working of the ejectors there are two sets of compound steam air compressors which force air into a receiver, made from one of the old boilers, whence it is conducted by iron pipes to the ejectors, which are automatic in their action. Directly they are filled with sewage a float opens a valve, the compressed air is let in, and the contents of the ejector is forced to the desired place. As adjuncts to the pumping plant there is a Green's patent fuel economiser and a Wright's patent feed water heater with other modern appliances for obtaining the utmost duty from the fuel consumed. New buildings have been erected to contain this new machinery.

RIVER COLNE.

I reported on the condition of the river in October. Means of enforcing the proper cleaning of the river are under consideration.

A grave pollution of the river occurred through a sewer at Benskin's brewery being, in error, placed in connexion with a storm water drain. A large number of fish were killed. Since the cutting off of this sewer there has been no further complaint of pollution.

VITAL STATISTICS.

The town continues to grow very rapidly. At the census in 1891 the population of the Urban District was 16,819. The population estimated to the middle of 1898 was 27,500, an increase of 1,700 since the middle of 1897.

The area of the District is $1,044\frac{3}{4}$ acres, thus giving an average density of population of nearly 26·3 per acre.

Marriages.

During the year 1898, 218 marriages were registered. Deducting 24, in which neither of the contracting parties resided in the District, the Marriage rate is 14·1 per thousand.

Births.

The number of births registered during the year was 754, of which 363 were males, and 391 females. The Birth rate is therefore 27·38 per 1,000. The Birth rate last year was 26·27. There were 17 illegitimate births.

Deaths.

(See also Table A, page 9).

The total Deaths registered as occurring in the District in 1898, was 318. Seven must be deducted from this total, for 2 deaths in the Union, and 5 at the Cottage Hospital occurred to persons who, previous to their final illness, were not resident in the District.

The total Deaths thus corrected represent a mortality of a little over 11·3 per 1,000 of the estimated population. In 1897 the Death rate was only 10 per 1,000.

Comparing the Deaths under 1 year (*vide* Table A, page 9) with Births, it will be seen that the corrected Infant mortality was 144·5 per 1,000 Births registered.

TABLE I.—(A) TABLE OF DEATHS DURING THE YEAR 1898, IN THE WATFORD URBAN DISTRICT, CLASSIFIED ACCORDING TO DISEASES, AGES AND LOCALITIES.

MORTALITY FROM SUBJOINED CAUSES, DISTINGUISHING DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE.										MORTALITY FROM SUBJOINED CAUSES, DISTINGUISHING DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Names of Localities adopted for the purpose of these Statistics; Public Institutions being shown as separate localities.	MORTALITY FROM ALL CAUSES AT SUBJOINED AGES.							At all Ages.	Under 1 year.	1 and under 5.	5 and under 15.	15 and under 25.	25 and under 65.	65 and upwards.	Smallpox.	Scarlatina.	Diphtheria.	Membranous Croup.	Typhus.	FEVERS.						Cholera.	Erysipelas.	Measles.	Whooping Cough.	Diarrhoea and Dysentery.	Rheumatic Fever.	Phtisis.	Bronchitis, Pneumonia and Pleurisy.	Heart Disease.	Cancer.	Injuries.	All other Diseases.	Totals.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	Enteric or Typhoid.	Continued.	Relapsing.	Puerperal.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
(a) WATFORD ...	197	84	25	3	3	38	41	{ Under 5 5 upwds.	0</

TABLE II.—COMPARATIVE STATISTICS FOR DIFFERENT PORTIONS
OF THE DISTRICT.

DISTRICT.	POPULATION.	BIRTHS.	DEATHS.	NO. OF CASES OF INFECTIOUS DISEASE NOTIFIED.
Watford	27500	522	233	51
Callow Land		168	40	24
Bushey		64	38	13

TABLE III.

Schedule of Births and Deaths for previous Years.

Year.	Population.	Births.	General Birth Rate.	Deaths.	General Death Rate.	Zymotic Death Rate.
1880	10,000	323	32·3	191	19·1	2·5
1881	10,073	344	34·15	182	18·06	2·48
*1882	12,653	339	26·78	181	15·68	2·08
1883	12,684	433	34·13	231	16·23	1·13
1884	12,950	442	34·2	261	17·8	1·6
1885	13,220	425	32·9	262	17·3	2·7
1886	13,490	463	34·32	276	18·08	2·37
1887	13,840	462	33·38	216	13·51	1·
1888	15,000	466	31·06	294	19·6	2·49
1889	15,300	457	29·86	237	15·49	1·7
1890	16,000	328	20·5	248	15·5	·71
1891	16,819	396	23·54	242	12·94	·34
*1892	19,400	547	28·19	306	13·93	1·9
1893	20,500	580	28·78	284	12·82	·87
1894	21,500	610	28·37	248	10·46	·51
1895	23,200	724	31·2	400	15·38	2·34
1896	24,000	606	28·58	285	11·87	·87
1897	25,800	679	26·62	270	10·0	1·00
1898	27,500	754	27·38	318	11·3	2·29

* District enlarged in these years.

ZYMOTIC DISEASES.

(See also Table B, page 12.)

The seven principal zymotic diseases caused deaths as follows :—

Small-pox	...	...	...	...	...	0
Measles	...	...	...	...	...	3
Scarlatina	...	...	...	...	...	2
Diphtheria	...	...	...	...	...	1
Membranous Croup			...	...	...	0
Whooping Cough	...	...	...	...	...	5
Fevers	{	Typhus	...	...	...	0
		Enteric	...	...	...	2
		Others	...	...	...	0
Diarrhœa	...	...	...	...	...	50
Total						63

The zymotic death-rate is therefore 2·29, while in 1897 it was exactly 1 per thousand. Were it not for diarrhœa the zymotic death-rate would be rather less than 0·5 per thousand.

The Infectious Diseases Notification Act was adopted in April, 1891. Eighty-eight cases of notifiable disease occurred during 1898, namely :—

Scarlatina	...	33, of which 2 were fatal
Diphtheria	...	25 „ 1 was fatal
Enteric Fever	14	„ 2 were fatal
Erysipelas	...	14 „ 0 „
Croup ...	...	1 „ 0 „
Puerperal Fever	1	„ 0 „

This gives a notifiable disease rate of 3·2 per thousand of the population, a considerable improvement over the previous year, when there were 113 cases giving a rate of 4·76 per 1,000.

TABLE IV.—(B.) TABLE OF POPULATION, BIRTHS, AND OF NEW CASES OF INFECTIOUS SICKNESS, COMING TO THE KNOWLEDGE OF THE MEDICAL OFFICER OF HEALTH, DURING THE YEAR 1898, IN THE WATFORD URBAN DISTRICT; CLASSIFIED ACCORDING TO DISEASES, AGES AND LOCALITIES.

Names of Localities adopted for the purposes of these Statistics; Public Institutions being shown as separate localities.	POPULATION AT ALL AGES.		Registered Births.	NEW CASES OF SICKNESS IN EACH LOCALITY COMING TO THE KNOWLEDGE OF THE MEDICAL OFFICER OF HEALTH.										NUMBER OF SUCH CASES REMOVED FROM THEIR HOMES IN THE SEVERAL LOCALITIES FOR TREATMENT IN ISOLATION HOSPITAL.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	Last Census.	Estimated to middle of 1898.		Aged under 5 or over 5.	FEVERS.							Smallpox.	Scarlatina.	Diphtheria.	Membranous Group.	Typhus.	Enteric or Typhoid.	Continued.	Relapsing.	Puerperal.	Cholera.	Erysipelas.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Watford ...	16,819	27,500	516	{ Under 5 5 upwards.	3	4	8	1	7	2	13	4</

SMALL POX.

The District has been free from small pox since February, 1895. Whether it will continue in that happy condition is a question of grave doubt. For, as the population becomes more and more susceptible, owing to the disastrous repeal of compulsory vaccination, so will the liability to a serious outbreak of this terrible disease become more and more likely. Vaccination and re-vaccination is the only means of keeping small pox away from this town. In 1896 30 out of every 100 children born in the Watford District (comprising Watford, Aldenham and Bushey) were defaulters under the Vaccination Act; in the Urban District alone, the Vaccination Officer informs me, during 1898 there were no less than 530 defaulters.

DIARRHŒA.

During 1897 only 8 deaths were ascribed to diarrhœa. In 1898 no less than 50 deaths came under this heading, 38 of which were in children under 1 year. A large proportion of the deaths from this cause occurred during August, September and October; the maximum being reached in September, when there were from all causes 49 deaths, of which 25 were certified as being caused by diarrhœa. To the long continuance of hot weather during those months is doubtless to be attributed this high mortality.

DIPHTHERIA.

Only 25 cases of diphtheria were notified, with but one fatal case, as compared with 41 cases and 6 deaths during 1897. Early diagnosis, by means of bacteriological examination, as adopted in the Rural District, would tend to decrease this serious disease. In one family alone five cases occurred. There was here a definite history of the first case being subjected to sewer

air, for she was in the habit, during the long spell of dry weather, of playing over a storm water gulley which, owing to neglect during construction was in direct communication with the sewer.

ENTERIC FEVER.

Fourteen cases were notified, of which two ended fatally. In a large proportion of the cases the disease was contracted away from Watford. One occurred near the Rookery, where proper sewerage is badly needed.

TABLE V.—SHOWING DATES NOTIFICATION RECEIVED.

MONTH.	SCARLATINA	DIPHTHERIA	ENTERIC FEVER.	ERYSIPELAS.	MEMBRANE- OUS GROUP.	PUERPERAL FEVER.	TOTAL FOR QUARTER.
January ...	3	0	0	1	0	0	} 13
February ...	1	0	6	0	0	0	
March	2	0	0	0	0	0	
April	1	0	0	3	0	0	} 11
May	1	2	0	0	0	0	
June	2	2	0	0	0	0	
July	3	2	0	1	0	0	} 21
August	1	1	2	0	0	0	
September	5	2	1	3	0	0	
October	6	9*	2	2	1	0	} 43
November	6	4	0	2	0	1	
December	2	3	3	2	0	0	
TOTAL	33	25	14	14	1	1	88

* 5 cases in one House.

TABLE VI.—SHOWING No. OF NOTIFICATIONS AND DISEASE NOTIFIED
FROM 1891 TO 1898.

DISEASE.	1891	1892	1893	1894	1895	1896	1897	1898
Small Pox	*—	—	10	1	1	—	—	—
Scarlatina	4	52	364	60	66	44	46	33
Diphtheria	12	10	8	7	23	28	41	25
Membranous Croup ...	—	2	5	2	2	—	1	1
Fevers—								
Enteric or Typhoid...	9	5	2	7	3	9	6	14
Continued	—	—	—	—	1	—	1	—
Puerperal	—	1	1	—	1	—	—	1
Erysipelas	7	18	26	6	13	20	17	14
Estimated Population.	16,819	19,400	20,500	21,500	23,200	24,000	25,800	27,500

* For 9 months.—Notification Act came into force in April of this year.

PRECAUTIONS TAKEN TO PREVENT THE SPREAD OF INFECTIOUS DISEASE.

The following are the means adopted to prevent the spread of infectious disease :—

Immediately notification is received the infected house is visited by myself, as well as by the Sanitary Inspector, and, if the case be not removed to the Isolation Hospital, steps are taken to ensure its proper isolation at home.

Intimation is given to the Head Master of the schools attended by members of the infected household, with the view of excluding children until there is reason to believe they are no longer in an infectious condition.

On the recovery of the patient, or on the removal to the hospital, the rooms are sulphured, the walls are stripped, all woodwork cleansed with carbolic water, and the ceilings limewashed. Where permission is obtained, which is usually the case, the infected bedding is sent to the hospital for disinfection with steam.

All library books found on the premises are either sent to the Fever Hospital or are burnt.

The disinfection of the house is personally conducted by Mr. Baker or his assistant.

I consider it would be an additional safeguard against the spread of infection, if, in addition to sending the usual notification by hand or post, the Medical Practitioners of Watford would, as soon after diagnosis as possible, communicate with me or the Sanitary Inspector by telephone to the Urban Council Offices, No. 71. By this means, much valuable time lost in the postal transmission of the notification form would be saved.

ISOLATION HOSPITAL.

Under the able and zealous direction of the Medical Superintendent, Dr. King, and the Matron, Miss Davidson, this hospital continues to do most useful work for Watford and the District. Eighty-eight cases of notifiable disease occurred in the Urban District during the year. Of these, 14 were cases of erysipelas and 1 puerperal fever case, which were not considered suitable cases for admission to the hospital, thus leaving 73 cases which might have been treated at the hospital. Of this number no less than 65 were admitted, the other 8 cases being effectively isolated at their own homes. I take this opportunity of tendering my thanks to the Superintendent and Matron for the constant and courteous aid they have afforded me in dealing with infectious disease in Watford.

COTTAGE HOSPITAL.

The Cottage Hospital continues to do most useful work. During the year no less than 186 cases were treated.

DAIRIES.

The regulations of dairies, cow sheds, and milk shops, and the supervision of milk sellers, have had systematic attention throughout the year, fortnightly visits being paid by the Sanitary Inspector. Special care is taken that the ventilation, lighting, cleansing, draining, and water supply of the premises used for the milk trade are thoroughly efficient. Printed regulations are supplied to all engaged in the business, and everything that is necessary for maintaining milch cows in health and condition, and for preventing milk from infection or contamination, is insisted on. Several dairies have been considerably improved from the sanitary point of view.

BAKEHOUSES.

These have been inspected from time to time ; they have been found fairly clean and well kept.

SLAUGHTER HOUSES.

These have been inspected regularly. They have been kept clean, but several of them, from the method of their construction, are unfit for use, and should be closed.

Last year my predecessor in his report said :—" I trust in the near future you may see your way to erect a public abbatoir, and, in furtherance of this object, will refuse all applications for new licenses that may be applied for. All slaughter houses should be provided with properly covered receptacles for the removal of blood, garbage and filth, and other results of slaughtering. At present the common practice is to deposit the same on the manure heap." I most heartily concur in these views, and consider the construction of a public abbatoir most desirable.

PUBLIC LAVATORIES.

The Council would do well to consider the question of providing more of these conveniences, which are badly needed in several parts of the town.

ELECTRIC LIGHT.

Preparations for the supply of Electric Light to the town are rapidly progressing, and it is hoped that shortly they will be complete.

BATHING PLACE.

The existing bathing place is lacking in size, convenience, and suitable sanitary arrangements. Much might be done here to the general gain of the town.

INSANITARY PROPERTY.

Ballard's Buildings.—After considerable pressure, the owner has re-arranged the closet accommodation of this property, which used to be of the most objectionable and dangerous nature. The serious risk of polluting the general water supply has thus been removed. The cottages are in many cases in a poor state of repair, and are damp, dark and ill ventilated. The draining of the yard is defective on account of the bad paving.

Butcher's Yard, Red Lion Yard, Boot Yard, Lamb Yard, and Farthing Lane are being dealt with under the Private Streets Act. Bridge Place has been demolished and is being reconstructed on satisfactory lines.

UNSOUND FOOD.

There were 11 seizures of unsound food ; in all but one case the articles were condemned. In this latter

case the articles seized were returned by my order to the vendor. He brought an action for damages against the Council in the County Court, which failed, the Court holding that the Inspector had not acted with negligence as was suggested for the plaintiff. In the other cases the offending parties were cautioned, but no legal proceedings were considered necessary.

TOWN IMPROVEMENT.

The following streets and roads have been paved and lighted :—Garfield Street, Rosslyn Road, Wiggshall Road, and St. James' Road.

The following are in hand for this purpose :—Liverpool Road, Milton Street, Shakespeare Street, and Parker Street.

The following sewers and storm water drains have been completed :—An 18 inch sewer and a storm water drain have been laid in Hagden Lane, for the Harwood Estate ; an 18 inch sewer and a storm water drain have been completed in Gammon's Lane ; a 9 inch sewer has been laid for Watford Heath ; a 9 inch sewer and a storm water drain have been laid for Fearnley Street ; Lower Derby Road, Vicarage Road, and all the new roads in Callowland have been sewered ; a 9 inch sewer and a storm water drain for Watford Crescent are in hand.

RECREATION GROUNDS.

The Council has acquired a plot of ground in the Callowland district for this purpose. The Recreation Ground by the river side is being gradually filled up, but requires much attention before it will serve its purpose as a healthy play ground for Watford.

COMMON LODGING HOUSES.

The annexed Table gives full particulars regarding Accommodation, Sanitary Arrangements, &c.

TABLE VII.—COMMON LODGING HOUSES.

NAME OF HOUSE.	KEEPER OF HOUSE.	NUMBER OF BEDROOMS ALLOTTED TO LODGERS.		NO. OF BEDS.		AVERAGE NUMBER OF LODGERS PER NIGHT.				CUBIC SPACE PER LODGER AFTER MAKING DEDUCTIONS.	VENTILATION PROVISION, &c.	SANITARY ARRANGEMENTS AND GENERAL CONDITIONS OF PREMISES.	REMARKS.
		Double.	Single.	Married Couples.	Men.	Women.	Children.						
No. 3, New Street.	Wm. Day.	6	14	2	20	Nil.	2	306 cubic feet.	Windows to outer air, and Chimneys.	Two Closets situate in yard. Public Urinal close by. The walls are dry. The water supply sufficient.	This House is clean and orderly kept. The married couples' rooms are properly separated from the single beds.		
The Angel Inn, High Street.	A. Rayment.	5	2	3	14	1	3	436 cubic feet.	Windows to outer air, and Chimneys.	Three Closets situate in Yard. Urinal. The walls are dry. The water supply sufficient.	Further improvements are under consideration.		
The Holly Bush Inn, High Street.	H. Barr.	3	8	Nil.	15	Nil.	Nil.	250 cubic feet.	Windows.	The sanitary condition of this house has been materially improved, but is still not very satisfactory.			

The "Red Lion" and "Hit or Miss" have been abolished as Common Lodging Houses.

GENERAL SANITARY NOTES.

With the increasing population and the large area served by the Isolation Hospital, I think the Council should seriously consider the advisability of erecting a disinfecting apparatus of their own. Should a widespread epidemic occur in Watford much delay—and hence increased risk of infection—will be certain to occur if the town has to depend on the stove at the Hospital.

It would be a material advantage to the town, and in the long run save much expense if the Council could see their way to appoint a second Sanitary Inspector, whose chief duty should be the watching of new buildings in course of erection. Much of the new property is finished off in a very unsatisfactory way, as regards general sanitary building details.

Appended is an epitome of Mr. Baker's report, and some meteorological returns for the year.

I take this opportunity of expressing my indebtedness to Dr. Hardenberg, who has kindly acted for me on several occasions during my absence ; to Mr. Waterhouse and his assistant, Mr. Bennett, for much assistance in framing this Report ; and to Mr. Baker, for the very zealous and intelligent way he has aided me in the work of the past year.

I have the honour to be, Gentlemen,

Your obedient servant,

D. HARVEY ATTFIELD.

SUMMARY OF ACTION TAKEN BY THE SANITARY INSPECTOR DURING THE YEAR 1898.

Communications received respecting complaints	...	...	...	620
Orders issued for sanitary amendment of premises	...	...	...	255
Defective drains opened up and re-laid	...	...	...	57
Defective soil pipes and ventilating shafts carried up efficiently	...	...	...	119
Wastes from baths, lavatory fittings, and sinks properly trapped	...	...	...	95
Defective closets	...	...	...	205
Drains repaired, cleansed, and trapped	...	...	...	77
New water closets constructed to replace dilapidated buildings	...	...	...	37
Houses and premises repaired, cleansed, and purified	...	...	...	111
Houses fumigated, paper taken off walls, and either re-papered or coloured	...	...	...	89
Accumulations of manure and organic matter removed	...	...	...	56
Manure receptacles constructed	...	...	...	5
Yards re-paved...	...	...	...	7
Unwholesome houses abolished	...	...	...	14
Overcrowdings abated	...	...	...	7
Animals removed, being improperly kept	...	...	...	20
Common lodging-houses visited	...	...	...	4
Bakehouses	...	...	Regularly inspected.	
Licensed slaughterhouses	...	...	do.	
Dairies, cowsheds, and milkshops...	...	...	do.	
Meat seizures, etc.	...	...	...	11
Prosecutions following thereon	...	...	...	0
Houses numbered	...	...	Various...	
Scavenging of the district	...	...	Superintended.	
Carcases of dead dogs, cats, etc., removed and properly buried.			Numerous.	
Travelling vans visited	...	...	Various.	
Urinals provided	...	...	...	2
Infected houses visited	...	...	...	89

1898. A CONTRIBUTION TO THE METEOROLOGICAL RETURNS FOR WATFORD.

The total rainfall for the year was 16·65 inches. Rain fell on 147 days. Last year (1897) the rainfall was 25·73 inches, and the days on which rain fell 166.

The vertical fluctuation of subsoil water was only 2·3 feet, as compared with last year's 5 feet 1 inch.

MONTH.	DAYS ON WHICH RAIN FELL.	RAINFALL*	AVERAGE HEIGHT OF SURFACE OF SUBSOIL WATER ABOVE MEAN SEA LEVEL.†
January.....	9	0·70	191·22
February.....	15	0·98	190·87
March	13	0·77	190·77
April.....	11	1·13	190·90
May.....	23	2·56	190·78
June	12	1·54	190·57
July	6	0·48	190·28
August	11	1·25	189·81
September	3	0·41	189·45
October.....	17	2·45	189·10
November.....	13	1·99	189·35
December	14	2·39	189·90

* As measured at Frogmore by A. P. Blathwayt, Esq.

† As measured at Ashlands by Professor Attfield, F.R.S. The floor of the pumphouse is 267 feet above sea level, and the well in which these observations were taken is 84 feet deep. The observations were made weekly. The highest readings observed were on January 9th and 16th, namely, 191·3 feet, while the lowest was on October 16th and 23rd, namely, 189·0 feet. The whole vertical fluctuation for the year was, therefore, 2·3 feet.

